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(54) **Dryer**

(57) A clothes dryer comprises a cabinet (10a) in which a clothes tumbling drum is rotatably mounted, said cabinet having a wall with an outlet opening (14) for warm air downward said drum. The cabinet (10a) comprises a top portion (16, 16a, 18) in which is slidably inserted a hanging rack (22, A, B) for hanging clothes, said hanging

rack (22, A, B) being able to assume an idle configuration in which it is inserted in the top portion (16, 16a, 18, 20) of the cabinet (10a) and an active configuration in which at least a portion thereof is pulled out from the cabinet so that hanging clothes are substantially adjacent said outlet opening (14).

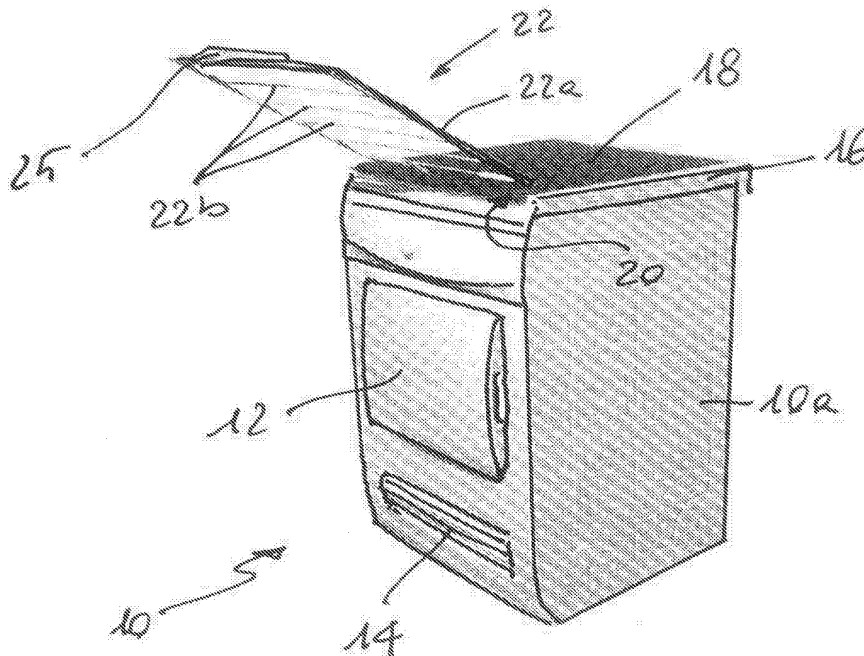


Fig. 1

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## Description

**[0001]** The present invention relates to a clothes dryer comprising a cabinet, a clothes tumbling drum rotatably mounted within said cabinet, this latter having a front wall with an outlet opening for warm air from said drum. The present invention is particularly related to a condenser dryer, but it can be used advantageously also for air vented dryers as well.

**[0002]** Many proposals have been advanced over the years for conserving the waste heat from the conventional domestic clothes dryer. For instance, US 2799948 discloses a dryer provided with a delicate goods drying compartment placed on one side of the dryer cabinet and fed with warm air downstream the drum. Even if such solution does provide a good drying for delicate clothes, it makes the drying machine much larger and heavier than a traditional one. Moreover the user has not always delicate clothes to be dried, and this makes the added compartment useless for a usual drying cycle of the machine.

**[0003]** Another similar solution is disclosed by US 4819341, where an auxiliary drying cabinet is stacked on top of a conventional dryer and receives hot air exhausted from such dryer through a conduit. A further solution is shown in EP 1146161 where an accessory assembly for a clothes drum type dryer is disclosed.

**[0004]** An object of the present invention is to provide a clothes dryer of the type mentioned at the beginning of the description that, while solving the problem of treating delicate clothes and using the waste heat, remains simple and with an overall dimension of a traditional dryer.

**[0005]** Another object of the present invention is to provide a dryer in which the device for drying delicate clothes does not encumber when not in use.

**[0006]** Further objects and advantages of the present invention will be apparent from the following description, with reference to the accompanying drawings, wherein:

- figure 1 is a perspective view of a dryer according to the invention;
- figure 2 is a perspective view of a portion of the dryer shown in figure 1, provided with a foldable accessory according to the invention;
- figure 3 is a plan view of the accessory shown in figure 2, in a flat configuration thereof;
- figure 4 is a perspective exploded view of a top portion of a dryer according to a further embodiment of the invention;
- figure 5 is a perspective view of the dryer shown in figure 4 in which the rack is fallen down for safety reason; and
- figure 6 and 7 are perspective view of a detail of the dryer in two different configurations of use.

**[0007]** With reference to the drawings, a condenser dryer 10 comprises a cabinet 10a in which a drum (not shown) is rotatably mounted. The drum is accessible through a door 12 for loading the clothes to be dried. In

the lower portion of the front wall, the dryer 10 is provided with a grid through which hot air is discharged from the heat exchanger (not shown) in bottom part of the dryer.

**[0008]** The top portion of the dryer is provided with a seat 16a defined in the top wall 16 of the cabinet 10a. This seat 16a is covered by a flat plastic cover 18 that defines, with the seat 16a, a hollow space or interspace 20 in which a hanging rack 22 is slidably mounted. The hanging rack presents a front portion A and rear portion B (figure 4), the front portion A being provided with a front plastic handle 25. The two side rods 22a of the rack 22 are connected by a plurality of parallel small rods 22b. The handle 25 is shaped so that, in the idle configuration of the hanging rack 22 (i.e. inserted in the interspace 20) is flush with the outside surface of the cabinet 10a. The rack 22 can be pulled out from the interspace 20 up to a predetermined position so that it remains suspended as a cantilever (figure 6). The user according to the amount of delicate clothes to be hanged on the rack 22 can adjust the position of the rack 22 either by leaving it in a horizontal configuration (figure 6) or by tilting it upwards of about 30 degree (figures 4 and 7). The warm air flowing from the heat exchanger in dryer plinth is directed by grid 14 in order to run over clothes (not shown) hanged on the rack 22.

**[0009]** In figures 2 and 3 it is shown a foldable deflector 24 to be used in connection with the grid 14 of the dryer 10 in order to convey warm air towards clothes hanged on the rack 22. The foldable deflector 24 can be made of polymeric material and presents a polygonal shape defining a central rectangular portion 24a and two side triangular portions 24b linked to the central portion 24a by means of film hinges 26. Each triangular portion 24b is provided, on a longer free edge 28, with a tab 30 adapted to be inserted in the lower portion of the grid 14 and with an elastic hook 31 adapted to grip an upper portion of the grid 14 in order to keep the deflector 24 in a stable position over the grid. In its flat configuration (figure 3) the deflector 24 can be easily inserted in the interspace 20 together with the rack 22. Therefore, by pulling out the rack 22, the user can take out the deflector 24, bend the two triangular portions 24b and then mount the deflector on the grid 14 as shown in figure 2 (in this figure the right triangular portion 24b is shown as only partially bent, i.e. in the process of being fixed to the grid). According to the invention, hot air from dryer heat exchanger is guided by deflector 24 to delicate clothes hanging on metal rack 22.

**[0010]** The two flat portions A and B of the rack 22 are linked together by a rotary mechanism 32. The flat portion B acts as a cantilever support of the portion A and cannot be pulled out from the interspace 20. The rotary mechanisms 32 is provided with knobs 32a (figures 6 and 7) allowing the portion A to assume several stable positions; one position is shown in figures 4 and 7, in which the portion A is inclined upwardly and it is therefore in a position substantially higher than the top wall 16 of the cabinet 10a, so that delicate clothes are better positioned,

depending on clothes length, with respect to the air flow coming out from the heat exchanger, particularly if the grid 14 is provided with the deflector 24.

[0011] Another position is shown in figure 5, where the portion A of the rack is in a fall down safety configuration in order to prevent the dryer from tilting down when, for instance, a child hangs on rack 22. For instance, the rotary mechanism 32 is designed so that the rack falls down when a force of  $10,5 \pm 2$  kg is applied to the rack.

[0012] While one example of the invention have been shown, it will be understood that various modifications and variations thereof may be effected without departing from the spirit and scope of the novel concepts thereof. For instance the plastic cover 18 may be translucent in order to make the hanging rack visible also in its retracted position, while the rack 22 can be realised in different ways, for instance by injection moulding a single piece of polymeric material.

[0013] Moreover the rack 22, instead of being built in two pieces hinged together, can be made of a single piece without the possibility of tilting it upward or downwards.

## Claims

1. Clothes dryer comprising a cabinet (10a), a clothes tumbling drum rotatably mounted within the cabinet, said cabinet having a wall with an outlet opening (14) for warm air downward said drum, **characterised in that** the cabinet (10a) comprises a top portion (16, 16a, 18) in which is slidably inserted a hanging rack (22, A, B) for hanging clothes, said hanging rack (22, A, B) being able to assume an idle configuration in which it is inserted in the top portion (16, 16a, 18, 20) of the cabinet (10a) and an active configuration in which at least a portion thereof is pulled out from the cabinet so that hanged clothes are substantially adjacent said outlet opening (14).
2. Clothes dryer according to claim 1, **characterised in that** it comprises a foldable deflector (24) which can be inserted, in its flat configuration, in the cabinet (10a, 16a, 18, 20) with the hanging rack (22, A, B) and which can be mounted, in its folded configuration, on the outlet opening (14) of the cabinet (10a) for conveying air flow towards clothes.
3. Clothes dryer according to claim 1 or 2, **characterised in that** the hanging rack (22, A, B) is housed in a seat (20) provided in the top panel (16, 16a, 18) closing the cabinet (10a).
4. Clothes dryer according to claim 3, **characterised in that** the seat (16a) is provided with a transparent cover (18).
5. Clothes dryer according to any of the preceding claims, **characterised in that** the hanging rack (22)

presents a first portion (A) adapted to be pulled out from the cabinet (10a, 20) and having a plurality of hanging rods (22b), and a second portion (B) adapted to remain in the cabinet (10a, 20) in order to support the first portion (A) in a cantilever configuration.

6. Clothes dryer according to claim 5, **characterised in that** between the first and the second portion (A, B) the hanging rack (22) is provided with a rotary mechanism (32, 32a) for orienting the first portion (A) in different predetermined inclined positions.
7. Clothes dryer according to claim 6, **characterised in that** the rotary mechanism (32, 32a) comprises a safety release system when a predetermined force is exerted on the first portion (A) of the rack (22)
8. Clothes dryer according to any of the preceding claims, **characterised in that** the hanging rack (22, A, B) has a front handle (25) which is flush, in the idle configuration of the rack, with the surface of the cabinet (10a).

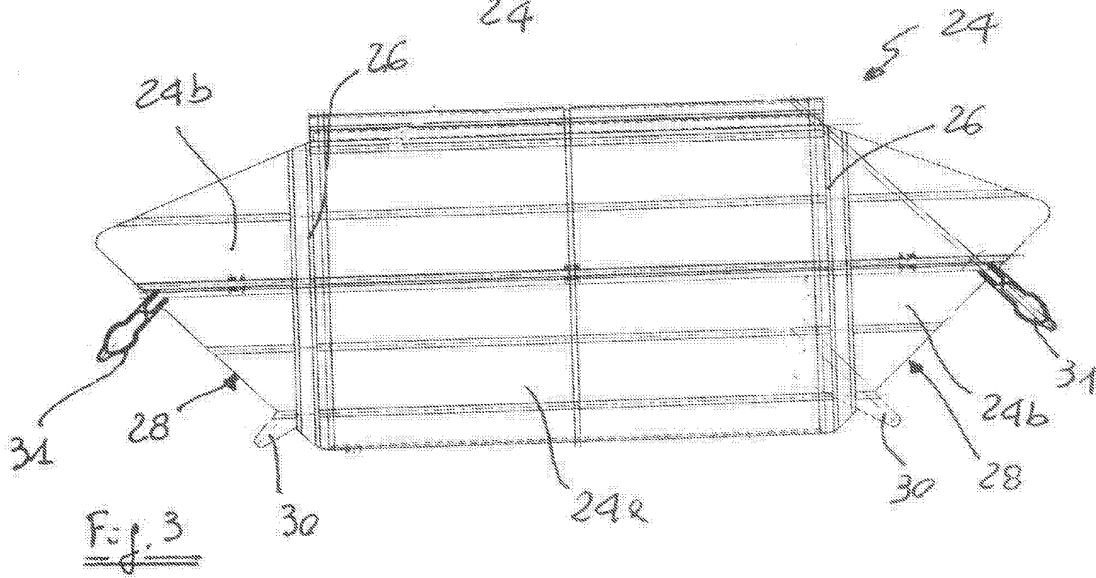
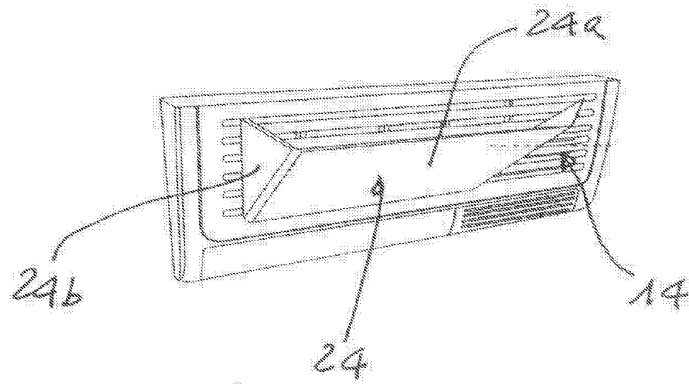
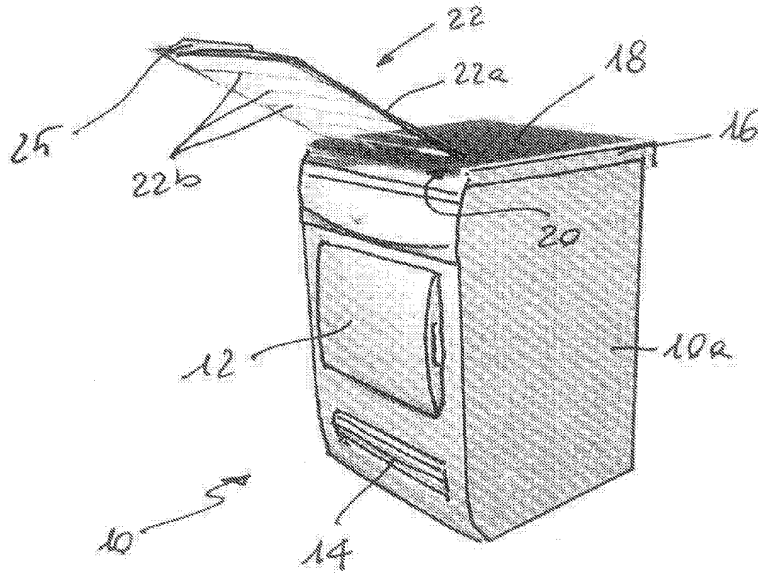


Fig. 4

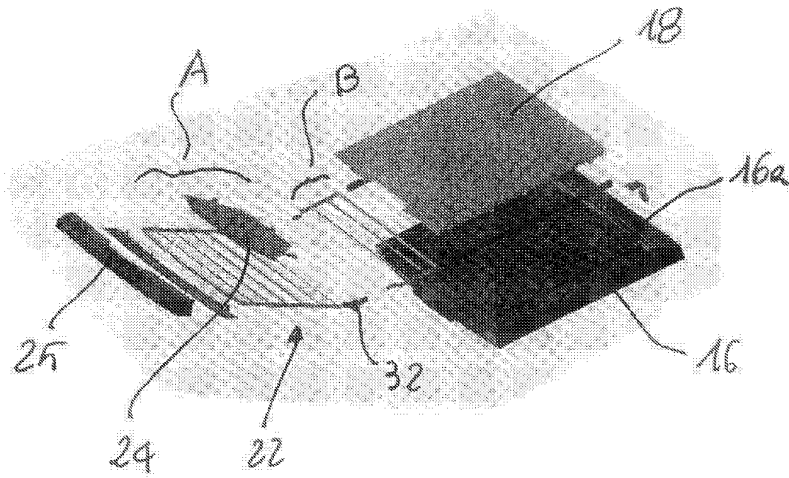


Fig. 5

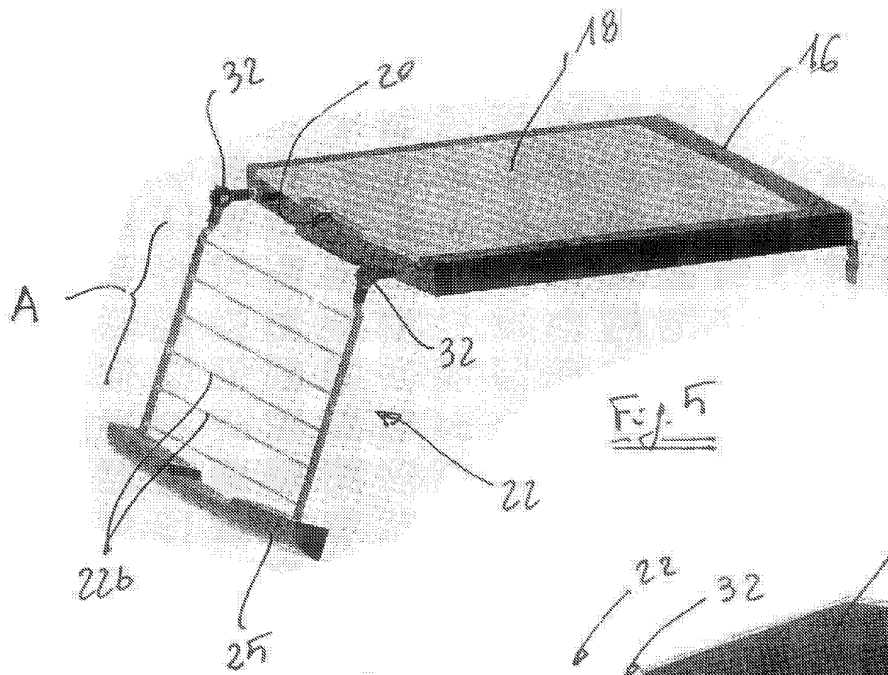


Fig. 6

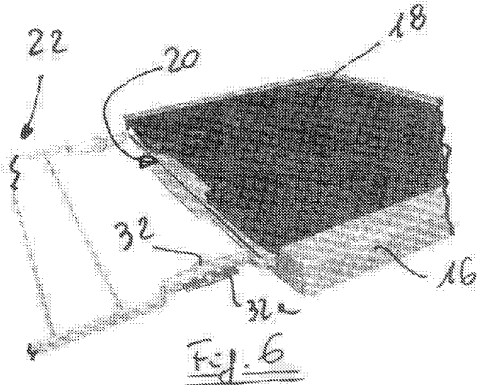
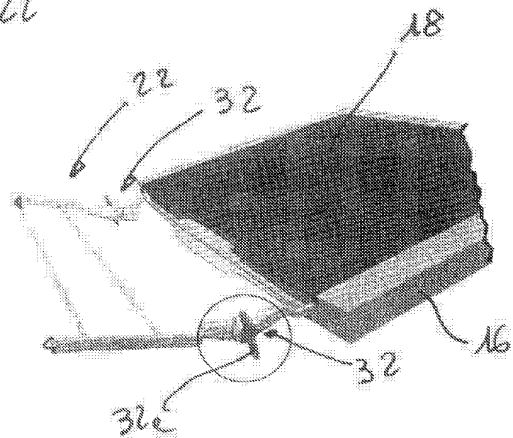


Fig. 7





European Patent  
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# EUROPEAN SEARCH REPORT

Application Number  
EP 06 11 4254

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 431 442 A (BSH BOSCH UND SIEMENS HAUSGERAETE GMBH) 23 June 2004 (2004-06-23) * column 3, line 1 - line 4; figures 2,5 *	1,8	INV. D06F58/16
A	EP 1 146 161 A (WHIRLPOOL CORPORATION) 17 October 2001 (2001-10-17) * the whole document *	1-8	
E	EP 1 710 342 A (ELECTROLUX HOME PRODUCTS CORPORATION N.V) 11 October 2006 (2006-10-11) * the whole document *	1-8	
A	WO 03/035961 A (ARCEL&IDOT; BUEKUELMEZ, BORA; ALTUN, UEMIT; EKSERT, &SCEDIL; UCKU, EMR) 1 May 2003 (2003-05-01) * the whole document *	1-8	
			TECHNICAL FIELDS SEARCHED (IPC)
			D06F
The present search report has been drawn up for all claims			
Place of search <b>Munich</b>		Date of completion of the search <b>12 October 2006</b>	Examiner <b>DIAZ, M</b>
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone  Y : particularly relevant if combined with another document of the same category  A : technological background  O : non-written disclosure  P : intermediate document</p> <p>T : theory or principle underlying the invention  E : earlier patent document, but published on, or after the filing date  D : document cited in the application  L : document cited for other reasons  &amp; : member of the same patent family, corresponding document</p>			

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EPO FORM 1503 03/02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 06 11 4254

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
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12-10-2006

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**REFERENCES CITED IN THE DESCRIPTION**

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- US 2799948 A [0002]
- US 4819341 A [0003]
- EP 1146161 A [0003]



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**ABSTRACT:**

CHG DATE=20071123 STATUS=O>A clothes dryer comprises a cabinet (10a) in which a clothes tumbling drum is rotatably mounted, said cabinet having a wall with an outlet opening (14) for warm air downward said drum. The cabinet (10a) comprises a top portion (16, 16a, 18) in which is slidably inserted a hanging rack (22, A, B) for hanging clothes, said hanging rack (22, A, B) being able to assume an idle configuration in which it is inserted in the top portion (16, 16a,

18, 20) of the cabinet (10a) and an active configuration in which at least a portion thereof is pulled out from the cabinet so that hanged clothes are substantially adjacent said outlet opening (14).